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Numerical Relativity in effective field theories of gravity

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The age of gravitational-wave astronomy is now in full swing. For the first time, we gain observational access to the highly dynamical strong-field regime of the gravitational interaction. Constraining potential deviations from General Relativity (GR) requires reliable waveform predictions, not just in GR, but also when higher curvature corrections contribute to the dynamics. I will present an overview of recent progress on
(i) mathematical well-posedness,
(ii) numerical nonlinear waveforms, and
(iii) statistical comparison to observational data.
In combination, the above constitutes a feasible pathway to use current and future gravitational-wave observations to constrain effective field theories of gravity.

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